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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/815,465 | 03/31/2004 | Shawn L. Lloyd | 884.C22US1 | 6387 |
| 21186 | 7590 | 11/22/2005 | EXAMINER | |
| SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH 1600 TCF TOWER 121 SOUTH EIGHT STREET MINNEAPOLIS, MN 55402 | | | | PAREKH, NITIN |
| | | ART UNIT | | PAPER NUMBER |
| | | 2811 | | |

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/815,465 | LLOYD ET AL. |
| | Examiner | Art Unit |
| | Nitin Parekh | 2811 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 12 September 2005.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-27 and 32-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 1-10 is/are allowed.
- 6) Claim(s) 11,16-23,25-27 and 32-35 is/are rejected.
- 7) Claim(s) 12-15 and 24 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 12 September 2005 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachmnt(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelly et al. (US Pat. 5798567) in view of Miyazawa (US Pat. App. Pub. No. 2002/0182842).

Regarding claims 11 and 16, Kelly et al. disclose an integrated circuit (IC) device/package/assembly having a ball grid array (BGA) semiconductor device (see 61/63 in Fig. 5), the device/package comprising:

- a substrate including a first/bottom major surface (63 and 68 respectively in Fig. 5) including a plurality of portions/an array of conductive pads/lands (CP/CL) including first, second and third portions (see pads under solder balls and various components – not numerically referenced in Fig. 5) and a second/top major surface
- a plurality of passive/discrete components including more than three components having substantially the same dimensions/height, the components comprising capacitors (67 in Fig. 5) being attached using conventional surface mount

attachment to respective second and third portions of the CL/CP on the first/bottom surface

- a plurality/array of solder balls/spacers (see 69 in Fig. 5) having a first height/h1 with respect to the first/bottom major surface of the BGA device being attached to respective first portions of the CP/CL on a printed circuit board (PCB)/substrate (71 in Fig. 5),
- the passive/discrete components further having a second height/h2 with respect to the first/bottom surface, the h2 being smaller than the h1 (Fig. 5; Col. 4, lines 6-66; Col. 2-5).

Kelly et al. fail to teach at least one component being a sacrificial component (SC) from the passive/discrete components being attached to the first major surface wherein the SC includes a fuse.

Miyazawa teaches a module/ICP having a variety of plurality of electronic parts/components on top and bottom surface of an interconnect substrate/board (see 20, 22, 42, etc. on 10 in Fig. 1B), the module/ICP further comprising:

- the electronic parts/components using surface mount attachment and including active components such as an IC device and passive/discrete components such as capacitor, fuse component/SC (see 22 in Fig. 1B; section 0079) the interconnect substrate/board having an array/plurality of first, second and third

portions of the interconnect patterns/CP/CL, etc. (see 16 under various components in Fig. 1A/1B)

- the SC/fuse (see 22 in Fig. 1B) being positioned between two solder contacts on respective/third portion of the interconnect patterns/CP/CL (see 30/32 in Fig. 1A/1B), and the component (see 22 in Fig. 1B) having a bottom surface positioned near the printed circuit board that is devoid of electrically conductive material, the other passive/discrete components being positioned on the respective/second portions of the interconnect patterns/CP/CL
- the SC/fuse comprising a body, the body having a first surface/bottom including two solder contacts at the sides/ends of the SC and a second/top surface substantially parallel with the first/bottom surface devoid of the CL/CP/conductor and the second top surface being away from the CL/CP/conductor (see 22 in Fig. 1B; sections 0079-0081)

(Fig. 1A-3; sections 0073-0122).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate at least one SC including a fuse as taught by Miyazawa so that the desired electrical performance/reliability, device integration and noise reduction can be achieved in Kelly et al's device.

3. Claims 17-20, 32, 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelly et al. (US Pat. 5798567) and Miyazawa (US Pat. App. Pub. No. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagishi (US Pat. 4869972).

Regarding claims 17-20 and 32, 33 and 35, Kelly et al. and Miyazawa teach substantially the entire structure as applied to claim 11 above, wherein Miyazawa teach the SC/fuse component being in a conventional block configuration, but Kelly et al. and Miyazawa fail to teach the SC/fuse comprising a C-shaped conductor wherein the fuse is embedded/molded within the body of the SC, the body being an insulative material.

Hatagishi discloses a fuse/SC structure (see A/B in Fig. 1-3) wherein the fuse/SC (1-3 in Fig. 1 and 2) comprises:

- a first and second major surfaces (see side surfaces 7/9 in Fig. 2) including first and second solderable surfaces (see 9 in Fig. 2)
- the fuse (see 1 and 2 in Fig. 2 and 3) being positioned between the first and the second solderable surfaces which are electrically connected to one another and being fixed/embedded/molded within an insulating/plastic casing/body/non-conductive casing (7 in Fig. 3; Col. 3, line 12) such that the top/other surface is devoid of material other than the substantially insulative/nonconductive material (see Fig. 3)

- the fuse/SC comprising a conventional C/U shaped conductor having two contacts/free ends (see 9/3/2 in Fig. 2 and 3) to provide the desired electrical connection to respective contact sites (see 3/9 in Fig. 2 and 3), the fuse/SC further having a low heat generation and longer service life

(Col. 2, line 11- Col. 3, line 45).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate fuse comprising a C-shaped conductor wherein the fuse is embedded/molded within the body of the SC, the body being an insulative material as taught by Hatagishi so that the heat generation can be reduced the electrical performance/reliability can be improved in Kelly et al's device.

4. Claims 21-23 , 25-27 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelly et al. (US Pat. 5798567) and Miyazawa (US Pat. App. Pub. No. 2002/0182842) as applied to claims 1-7 above, and further in view of Hatagishi (US Pat. 4869972) and Sugita et al. (US Pat. 5068706).

Regarding claims 21-23 and 25-27 and 34, Kelly et al., Miyazawa and Hatagishi teach substantially the entire claimed structure as applied to claims 11 and 17-20 above, but fail to teach at least one or a plurality/three non operational SC being attached to the third portion of the array of CL.

Sugita et al. teach an ICP having a variety of fuse/SC configurations wherein the fuse/SC is in non operational state/blown configuration (see Fig. 6C, 81 in Fig. 9B, etc.).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate at least one or a plurality/three non operational SC being attached to the third portion of the array of CL as taught by Sugita et al. so that breakage of functional components can be prevented and the electrical performance/reliability can be improved in Miyazawa, Hatagishi and Kelly et al's device.

Response to Arguments

5. Applicant's arguments filed on 09-12-05 have been fully considered but they are not persuasive.

A. Applicant contends that there is no teaching of the SC with the fuse in Miyazawa.

However, Miyazawa clearly teaches a variety of parts/components comprising sacrificial component such as the fuse (see 22 in Fig. 1B; section 0079). It has been held that a recitation with respect to the manner in which the claimed fuse is intended to be employed does not differentiate the claimed fuse from the prior art fuse component satisfying the claimed structural limitations (Ex Parte Masham, 2 USPQ F.2d 147 (1987)).

Allowable Subject Matter

6. Claims 1-10 are allowed.
7. Claims 12-15 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Allowance

8. The following is an examiner's statement of reasons for allowance:

The references of record do not teach the limitations "at least one component attached to at least some of the plurality of lands on the first major surface, the at least one component having a first height with respect to the first major surface; and at least one sacrificial component attached to the first major surface, the at least one sacrificial component having a second height with respect to the first major surface, the second height greater than the first height" and "the at least one sacrificial component further including a fuse" in a device having a plurality of components attached on respective lands on a first major surface of a substrate.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 571-272-1663. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAN or Public PAG. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have

questions on access to the Private PAG system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Nitin Parekh

NITIN PAREKH

NP

11-15-05

PRIMARY EXAMINER

Technology Center 2800